SECTION 29 - CONCRETE MASONRY WALL

29-1 GENERAL

This work shall consist of furnishing all materials and constructing a concrete masonry wall at the locations as shown on the Plans. Included is the footing construction, reinforcing steel, concrete masonry units and other facilities to complete the wall as indicated on the Standard Drawings, and as specified herein. Concrete masonry wall shall be installed to the lines and grades shown on the Plans or as directed by the Engineer.

29-2 MATERIALS

Materials for concrete masonry wall construction shall be as follows:

29-2.1 Concrete Masonry Units: Hollow load bearing masonry units shall be Grade A units conforming to the **ASTM** Specifications Designation C90 and in addition the requirements of the Quality Control Standards of the Concrete Masonry Association. All masonry units shall be sound and free of cracks and other defects that would interfere with the proper placing of the unit or impair the strength or permanence of the construction. Minor cracks incidental to the usual method of manufacture, or minor chipping resulting from customary methods of handling in shipment and delivery, shall not be deemed grounds for rejection.

29-2.2 Cement: Cement shall be Type I or Type II Portland cement conforming to **ASTM** Specification Designation C150.

29-2.3 Mortar: Mortar shall be freshly prepared and uniformly mixed in the ratio of one part Portland cement, 1/4 part minimum to ½ part maximum lime putty or hydrated lime, damp loose sand not less than 2 ½ and not more than 3 times the sum of the volumes of the cement and lime used (4 ½ parts maximum), and shall conform to **ASTM** Specification Designation C270. If plastic type cement is used, lime putty shall be omitted.

29-2.4 Grout: Grout for pouring or pumping shall be as follows:

A. Grout for pouring shall be of “fluid consistency” and shall conform to **ASTM** Specification Designation C476. “Fluid consistency” shall mean as fluid as possible for pouring without segregation of the constituent parts. It shall be freshly prepared and uniformly mixed in the ratio of volumes as follows:

Type	Grout Space in its Least Dimension (inches)	Portland Cement (parts)	Damp Loose Sand (parts)	Damp Loose Aggregate (parts)
Fine	Less than 3	1	2 1/4 min - 3 max	-
Coarse	3 or more	1	2 min - 3 max	1 to 2

B. Grout for pumping shall be of "fluid consistency" as defined above and shall have not less than seven sacks of cement to each cubic yard of grout.

29-2.5 Lime: Hydrated lime shall conform to **ASTM** Specification Designation C207.

29-2.6 Aggregate: Aggregate for mortar shall conform to **ASTM** Specification Designation C144. Aggregate for grout shall conform to **ASTM** Specification Designation C404.

29-2.7 Concrete: Portland cement concrete for footing shall be Class A and conforming to the requirements of Section 90, "Portland Cement Concrete," of the State Standard Specifications.

29-2.8 Reinforcing steel: Reinforcing steel shall be deformed bars conforming to **ASTM** Specification Designation A15 and A305, except that 0.25" ties may be plain bars. Wire reinforcement shall conform to **ASTM** Specification Designation A82.

29-3 CLEARING AND GRUBBING

Clearing and Grubbing shall conform to the requirements of Section 10, "CLEARING and GRUBBING," of these Specifications.

29-4 EXCAVATION AND PREPARATION OF SUBGRADE

Any required excavation or embankment construction for the wall footing shall be to the lines and grades shown on the Plans for established by the Engineer. Excavation, embankment construction and preparation of subgrade shall conform to the requirements of Section 11, "EXCAVATION AND GRADING," of these Specifications. Unless otherwise indicated, minimum relative compaction of finished subgrade for wall footing shall be 90 percent.

29-5 CONSTRUCTION

The wall and footing construction shall be of the highest quality workmanship and all walls shall be laid true, level, plumb and neat and in accordance with the Plans and the standard drawing pertaining thereto.

Forms for footing construction shall be straight and true. The exposed (after wall construction) finish top surface of the footing shall be a medium sweat finish.

Mortar and grout shall be mixed by placing half of the water and sand in the operating mixer. Then the cement, lime and remainder of the sand and water shall be added. After all ingredients are in the batch mixer, they shall be mechanically mixed for not less than 5 minutes. Hand mixing shall not be employed unless specifically approved. The mortar should be retempered with water as required to maintain high plasticity. Retempering on mortar boards shall be done only by adding water within a basin formed with the mortar and the mortar reworked into the water. Retempering may only be done prior to hardening of the mortar. Any mortar and grout which is unused after 1 ½ hours from initial mixing time shall be discarded.

For bonding the masonry to the foundation, the top surface of the concrete foundation shall be clean and with laitance removed and aggregate exposed before starting the masonry construction. The starting joint on foundations shall be laid with full mortar coverage on the bed joint, except the area where grout is to contact the foundation.

Mortar joints shall be straight, clean, and uniform in thickness and shall be tooled. Tooling shall be done when the mortar is partially set but still sufficiently plastic to bond. All tooling shall be done with a tool that compacts the mortar, pressing the excess mortar out of the joint rather than dregging it out. Joints that are not tight at the time of tooling shall be raked out, pointed, and then tooled. If it is necessary to move a masonry unit after it has been once set in place, the unit shall be removed from the wall, cleaned and set in fresh mortar. Lintels, capping units and all bearing plates set by the mason shall be set in a full bed of mortar.

In cases where the wall is in a frontage road island or against an unoccupied area such as railroad rights-of-ways, all cells shall be filled with grout. In other situations, only the cells with reinforcement are to be grouted. All grout shall be paddled or vibrated in place to consolidate without separation. Mortar droppings should be kept out of the grout space. Mortar that projects into the grout space shall be removed so that protrusions will not restrict the flow of grout (grout will tend to bridge at these locations and require too much puddling or vibration to assure complete filling of grout space). Vertical cells to be filled shall have a vertical alignment to maintain a continuous unobstructed cell area not less than 2" x 3". Grout for cells containing reinforcement shall be stopped 1 ½" below the top of the course to form a key at pour joints.

Reinforcing bars shall be straight except for bends or hooks as detailed on the Standard Drawings. Horizontal reinforcing bars shall be laid on the webs of the masonry units in continuous masonry courses, consisting of bond-beam or channel units, and shall be solidly grouted in place. Vertical reinforcing steel shall have a minimum clearance of 0.28" from the masonry, and not less than one bar diameter between bars. Wire reinforcement shall be completely embedded in mortar or grout. Joints with wire reinforcement shall be at least twice the thickness of the wire.

Concrete scum, and grout stains on the wall shall be removed immediately. After the wall is constructed, it should not be saturated with water for curing or any other purpose. At the conclusion of the masonry work, the Contractor shall clean all the masonry, remove equipment used in the work, and remove all debris, refuse, and surplus masonry material, and dispose of them away from the premises.

29-5.1 Measurement

Measurement for concrete masonry wall will be by the lineal foot of concrete masonry wall installed as shown on the Plans, to be determined by the Engineer from actual measurement.

29-6 PAYMENT

When the Contract does not include a pay item for clearing and grubbing, or for excavation and preparation of subgrade, as above specified, and unless otherwise provided in the Special Provisions, full compensation for any necessary clearing and grubbing, and any excavation and preparation of subgrade required to prepare the subgrade and pad for the wall foundation, as shown on the Plans or indicated by the Engineer, shall be considered as included in the price bid for concrete masonry wall and no separate payment will be made therefor.

The unit price bid per lineal foot for concrete masonry wall shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals and for doing all the work involved therein as shown on the Plans, as set forth in the Specifications, and as directed by the Engineer. This shall include, but not be limited to clearing and preparing the wall pad and subgrade (where no separate item is provided therefor), constructing concrete footing, furnishing and placing reinforcing steel, concrete block, mortar and grout, and all incidentals.